IN THE CLAIMS

The claims have not been amended with this Supplemental Preliminary Amendment and Response.

1. (Previously Presented) A tether system for space applications in low Earth orbit comprising:

at least one electron collector;

at least one electron emitter;

a power system;

at least one spinning electrodynamic tether, electrically coupled to the power system, said tether adapated to conduct electrical current between said at least one electron collector and said at least one electron emitter and to spin at an average rate exceeding approximately two times an orbital revolution with respect to inertial space; and

an electric control system, said control system adapted to control the electric current in said tether to thereby control the spinning and increase average long-term orbit transfer or power generation rates, taking advantage of spinning.

2. (Original) The tether system of claim 1 wherein said spinning electrodynamic tether comprises at least one type of tether selected from the group consisting of multi-strand tethers, flattened tethers, hollow tethers, and thin tape tethers.

3. (Original) The tether system of claim 1 comprising a bi-directional system, wherein the electric current in said tether is driveable in both directions in some or all segments of said tether.

4. (Original) The tether system of claim 1 comprising at least two electron collectors disposed at distinct locations and at least two electron emitters disposed at distinct locations.

5. (Original) The tether system of claim 1 wherein said electron collector comprises a net-like collector.

6. (Original) The tether system of claim 1 comprising a solar energy collector.

7. (Original) The tether system of claim 6 wherein said solar energy collector comprises a solar array.

8. (Original) The tether system of claim 7 comprising a thin-film solar array.

9. (Original) The tether system of claim 7 comprising a centrifugally-stabilized solar array.

10. (Original) The tether system of claim 1 comprising an energy storage device.

11. (Original) The tether system of claim 10 wherein said energy storage device has a capacity to provide energy for a portion of a spin.

12. (Original) The tether system of claim 10 wherein said energy storage device has a capacity to provide energy for a duration of an eclipse.

13. (Original) The tether system of claim 1 further comprising a deployer.

14. (Original) The tether system of claim 13 wherein said tether is stored in said deployer using turns and said turns are fastened in such a way that a minimum tension is required to unwind said tether turns from said deployer.

15. (Original) The tether system of claim 14 wherein said tether turns stored in said deployer are bound with a weak adhesive.

16. (Original) The tether system of claim 15 wherein said tether turns stored in said deployer are bound with a vacuum grease.

17. (Original) The tether system of claim 13 wherein one or more segments of said tether have both ends of a wound segment at an outside of a winding, with said ends exposed and each end attached to a separate object and said both ends are deployed simultaneously.

18. (Original) The tether system of claim 13 wherein said deployer provides full or partial retraction of said tether.

19. (Original) The tether system of claim 1 comprising multiple tethers wherein said tethers form a configuration selected from the group consisting of a triangular configuration, a polygonal configuration, and a polyhedronal configuration.

20. (Previously Presented) A method for operating a spinning electrodynamic tether system in low Earth orbit, the method comprising the steps of:

providing a spinning electrodynamic tether;

spinning the electrodynamic tether at an average rate exceeding approximately two times an orbital angular rate of the low Earth orbit; and

controlling the electric current in the tether to thereby control the spinning and increase average long-term orbit transfer or power generation rates, taking advantage of spinning.

21. (Original) The method of claim 20 comprising the step of varying electric current in the tether as a primary control output.

22. (Original) The method of claim 20 further comprising the step of changing direction of electric current in the teather.

23. (Original) The method of claim 22 comprising the step of switching from electron collection at one location to electron collection at another location when the electric current direction is reversed.

24. (Original) The method of claim 21 wherein the step of varying the electric current comprises providing intervals of significantly reduced current or no current to better measure EMF and plasma parameters.

25. (Original) The method claim 20 wherein either electron collection, or emission, or both, occurs at more than one location along the tether at a same time, to allow better control of spin dynamics by varying electromagnetic torque on the tether.

26. (Original) The method of claim 20 wherein no substantial energy storage is used, and in eclipse, the electric current in the tether is controlled to utilize power from EMF.

27. (Original) The method of claim 20 wherein limited energy storage is used to store energy during one portion of a spin and release it during another portion of the spin.

28. (Original) The method of claim 20 wherein energy storage is used to store energy during one portion of an orbit and release it during another portion of the orbit.

29. (Original) The method of claim 20 wherein a spin axis of the tether system is at an arbitrary angle to its orbital plane.

30. (Original) The method of claim 20 comprising gradual variation of a spin axis orientation during operation.

31. (Original) The method of claim 20 comprising gradual variation of the spin rate during operation.

32. (Original) The method of claim 20 comprising gradual variation of a spin phase during operation.

33. (Original) The method of claim 20 comprising adjusting at least one parameter selected from the group consisting of spin axis, spin rate and spin phase by varying at least one parameter selected from the group consisting of direction, duration, amount, and path-length of current flow through the tether.

34. (Original) The method of claim 20 comprising the step of adjusting a spin axis orientation to increase solar energy collection.

35. (Original) The method of claim 20 comprising the step of adjusting the spin rate to provide a desired level of artificial gravity at one or more locations in the tether system.

36. (Original) The method of claim 20 comprising the step of using centrifugal force induced by spinning to assist tether deployment.

37. (Original) The method of claim 36 comprising the step of using a minimum pull-out tension to prevent tether slackness and keep the tether system spinning during deployment.

38. (Original) The method of claim 36 comprising the step of using electromagnetic torque to assist tether deployment.

39. (Original) The method of claim 20 comprising the step of varying electric current in the tether to produce a desired cumulative variation of orbital elements over a given period of time.

40. (Original) The method of claim 20 comprising the step of utilizing spinning to provide a higher thrust.

41. (Original) The method of claim 20 further comprising the step of utilizing spinning to provide a higher rate of change of orbital elements.

42. (Original) The method of claim 20 further comprising the step of providing a solar energy collector.

43. (Original) The method of claim 42 comprising the step of providing solar energy collector stabilization by centrifugal force.

44. (Original) The method of claim 42 comprising the step of rotating the solar energy collector about the tether to improve power output depending on a spin angle.